Three forms

$f(x) = ax^2 + bx + c$ → polynomial form

$f(x) = a(x-h)^2 + k$ → vertex form
Standard form

$f(x) = a(x-R_1)(x-R_2)$ → factored form

Find vertex

Polynomial form $x = \frac{-b}{2a}$ y = plug in x-coord into eq.

vertex form vertex (h, k)

factored form x = avg of two roots y = plug x into eq.

Zeros

Polynomial form → factor, quad. formula, complete sq. and solve

vertex form → set y to zero, solve for x

factored form → R_1 & R_2 are the zeros

(9) $y = \underset{a}{-3}x^2 \underset{b}{+2}x \underset{c}{+1}$

vertex

$x = \frac{-b}{2a}$ $\quad x = \frac{-2}{2(-3)} = \frac{1}{3}$

vertex $\left(\frac{1}{3}, \frac{4}{3}\right)$

$y = -3\left(\frac{1}{3}\right)^2 + 2\left(\frac{1}{3}\right) + 1$

$= -\frac{1}{3} + \frac{2}{3} + \frac{3}{3} = \frac{4}{3}$

Roots/zeros

$y = -3x^2 + 2x + 1$

$(-3x + 1)(-x + 1)$

$-x + 1 = 0$

$x = 1$

$x = -\frac{1}{3}$

(h)

$y = 4x^2 + 3x + 5$

vertex

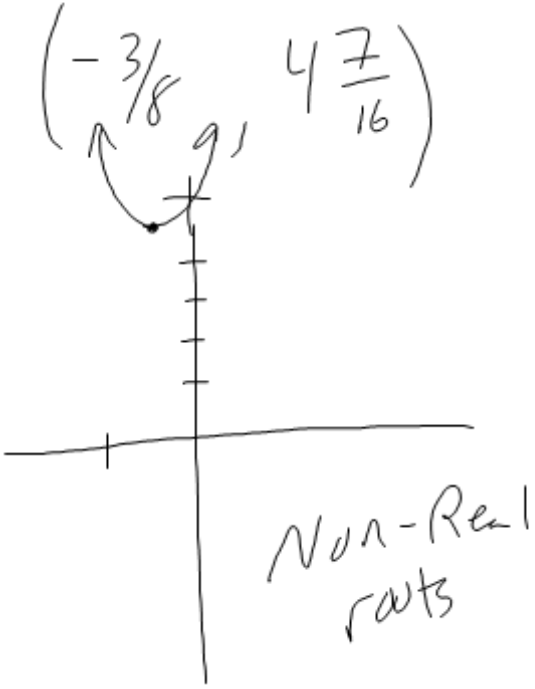
$x = \frac{-b}{2a} \rightarrow \frac{-3}{2(4)} = -\frac{3}{8}$

$y = 4\left(-\frac{3}{8}\right)^2 + 3\left(-\frac{3}{8}\right) + 5$

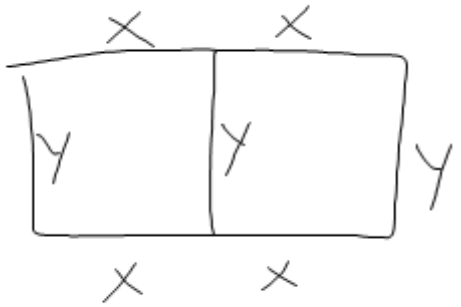
$y = \frac{4 \cdot 9}{64} + -\frac{9}{8} + \frac{40}{8}$

$\frac{9}{16} + -\frac{9}{8} + \frac{40}{8} = 4\frac{7}{16}$

vertex $\left(-\frac{3}{8}, 4\frac{7}{16}\right)$



(7)



$$200 = 4x + 3y$$

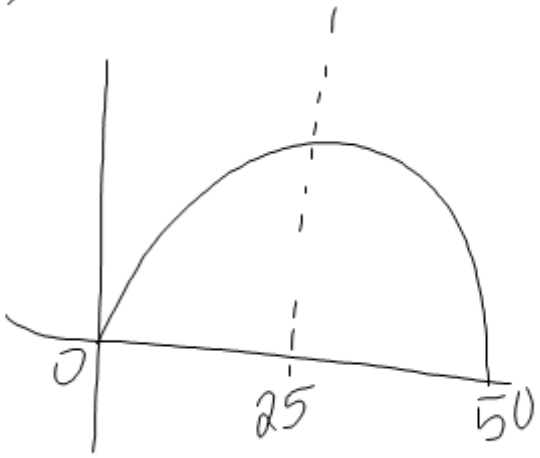
$$y = \frac{200 - 4x}{3}$$

$$A = 2xy$$

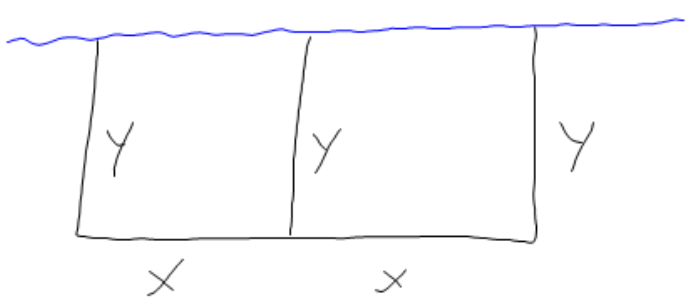
$$A = (2x)\left(\frac{200 - 4x}{3}\right)$$

zeo at 0 , 50

$x = 25$



(8)



$2x + 3y = 200$

$y = \frac{200 - 2x}{3}$

$A = 2xy$

$A = (2x)\left(\frac{200 - 2x}{3}\right)$

$2x \rightarrow 0$

$3 \cdot \frac{200 - 2x}{3} = 0 \cdot 3$

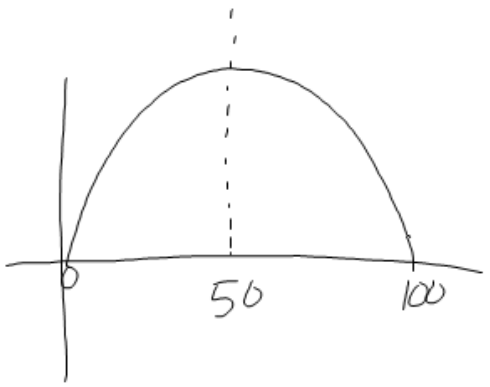
$200 - 2x = 0$

$+2x \quad +2x$

$200 = 2x$

$x = 100$

roots at 0, 100



To convert to

- Polynomial form → expand the squared term

- vertex form → find vertex, $a = a$
  plug in for h, k

- factored form → find roots $R_1 + R_2$, $a = a$

HW

- Go online, check your answers to this sheet
- Read 2.2, do the checkpoint problems & the examples #1-9